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Abstract

This empirical note deals with the contractual design of relationships in distribution networks. In the framework of agency theory, I study the royalty rate as an incentive device for the upstream firm in maintaining brand-name value, using recent French data to estimate probit models. The results are consistent with the analytical framework.

Key Words: Vertical Relationships; Distribution Networks; Contract Design; Two-sided moral hazard.

JEL Classification Numbers: C12; L14.

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1. Introduction

The growing importance of networks is a key trend over the last decades. This evolution involves all the fields of economic activity, including retail. The vast econometric literature dealing with the retail sector focuses on franchising. This paper extends the analysis to different types of networks, the aim being to study the presence of royalties in distribution contracts, which serve as one of the most important vertical restraints.

Vertical restraints are contractual provisions binding an upstream firm to one or several retailers. In this way, the upstream firm constrains the action of its distributors. Distribution contracts generally include a set of vertical restraints. The monetary distribution of the profit generated by the decentralised vertical structure is central to the arrangement. Two main provisions determine the share agreement: the up-front fee and the royalty rate. The up-front fee is a lump sum that must be paid by the retailer when entering the network. The literature has generally focused on the royalty rate, which defines the share of the retailer's profits that the upstream firm accrues. It is usually defined as a percentage of the downstream sales.

The relevance of agency theory in the study of vertical restraints is now widely accepted, thanks to the seminal contributions of Mathewson and Winter (1983, 1984, 1985) and Rey and Tirole (1986 a and b). In addition, the empirical literature emphasises the role of the agency arguments in explaining the organisational choices made by the upstream firm concerning its network of retailers. This body of literature has been developed since the late 1980s based on U.S. data. Investigations of European data are more recent; they include Arrunada *et al*. (2001) and Vazquez (2004; 2005) for Spain; Pénard *et al*. (2003), Chaudey and Fadairo (2006; 2010), and Barthélemy (2008) for France; Kidwell *et al*. (2007) for Norway; and Pfister *et al*. (2006) on international data for nine countries.

This study is based on the theoretical and empirical results on share-contracts in franchising within the context of double-sided moral hazard. Using recent data on French chains, I investigate the choice of including a royalty rate in distribution contracts. The original dataset goes beyond the strict framework of franchising and includes several types of distribution networks. It includes a wide range of retail sectors. I provide evidence that whatever the type of network, the royalty rate acts as an incentive device for the upstream firm to maintain the brand-name value.

The paper is organised as follows. Section 2 surveys the related literature and sets out the testable qualitative prediction. Section 3 describes the data and the empirical specifications. Section 4 contains the estimations. Concluding remarks are presented in Section 5.

2. Survey and Hypothesis

Theoretical background

The literature examines the bilateral contracting relationship between an upstream firm and a retailer within a distribution network. This is an agency relationship, as the upstream firm gives the downstream party a mandate for the commercial exploitation of its brand. The principal (the upstream firm) designs the contract. The retailer's decision consists of accepting or rejecting the contract. Contracts are uniform within the same network; the analysis refers to the « representative contract ».

A moral hazard emerges downstream, as the retailer's effort affects the profit function of the principal, who cannot observe this effort. The only observable variable is the result, i.e., the quantity sold on the retail market. In this situation, the status of total residual claimant appears to be the most effective incentive mechanism for the downstream firm. Subsequently, the share-contract includes an up-front fee and no royalties. Once the entry fee is paid, the retailer captures the totality of the results from its sale effort.

However, as shown by Blair and Lafontaine (2005), royalties are common in distribution contracts. In agency theory, they have two justifications. The first, initiated by Martin (1988), concerns the need to ensure the downstream firm against risk, namely, the hazard on the level of the final demand. In that case, the share contract defined by the royalty rate corresponds to a level of risk sharing.

This article deals with the second justification, in terms of incentives in the framework of a bilateral moral hazard. In networks based on the renting of the upstream firm's brand name, a moral hazard also emerges upstream because retail sales depend on the firm's effort. In some distribution networks, such as in business-format franchising, the reputation of the network (i.e., the brand name) represents the main contribution of the upstream firm. A strong level of brand-name capital favours sales on the final market. Building and supporting the chain's reputation is thus a key task for the upstream firm. The upstream moral hazard is linked to the fact that the downstream firm cannot fully observe the effort made by the upstream firm as it suffers the consequences. In that case, the contract also has to contain an incentive mechanism for the upstream firm. The two-sided moral hazard context involves ongoing payments to the upstream firm to motivate its efforts in promoting the brand throughout the duration of the relationship.

This bilateral moral hazard situation is the primary theoretical justification for profit-sharing contracts in distribution. The theory has been developed from the seminal article of Mathewson and

Winter (1985), who proposed the first formal analysis of franchise agreements in the framework of agency theory. Their model determines the necessary and sufficient conditions for sharing profits between the upstream firm and the retailer. It shows that issues related to risk are not necessary. Incentive motivations are sufficient to justify share contracts. In contrast to the employment contract, the franchise contract is a much stronger incentive for the retailer, who makes a marginal profit directly correlated to its own behaviour. In addition, Mathewson and Winter's model was the first in the literature on monetary terms to incorporate the context of a bilateral moral hazard. This requires the assumption of an incomplete contract concerning the franchisor's obligations in terms of promotional efforts at a national level. A contract for profit sharing, *i.e.,* where the royalty rate is non-zero, is required to solve the bilateral problem of incentives.

This result is completed by Lal (1990), who models the interaction between an upstream firm and its retailer to analyse the role of franchise agreements in the coordination of network members. More precisely, the model studies several contexts and shows that royalties are only required when the final demand depends on the behaviour of both the franchisee and the franchisor. Therefore, the model shows that without a two-sided moral hazard, there is no need for royalties, even with downstream opportunism. Thus, the bilateral moral hazard is at the heart of the explanation, and royalties within franchise contracts are exclusively justified by the influence of the brand name on the final demand.

A third model, in line with those just presented, is the main theoretical reference of the econometric studies devoted to monetary provisions within franchise contracts. Bhattacharyya and Lafontaine (1995) provide a theoretical explanation of the trends in payment rules in share contracts. The analysis concerns share contracts in general, of which franchising is a special case. The fact underlying these theoretical developments is the uniformity of contract terms within the principal-agent relationships. In the network, the provisions are generally identical between the principal and the different contracting agents. In other words, the payment rules are uniform and stable; this characteristic could not be explained by the legal constraints. The bilateral moral hazard model was developed to explain these properties, which are considered in a single principal-agent pair at first. The model is then extended to cases with multiple agents. It shows that the profits associated with the differences in the share-contracts between the franchisees are not high, which is consistent with observations. More precisely, the model specifies the conditions for determining the share-parameter, namely, the royalty rate. The bilateral moral hazard alone justifies the use of royalties, which means that this provision is required even for risk neutral parties. The optimal royalty rate encourages both the franchisor and the franchisee to invest in their respective inputs (brand marketing efforts, sales efforts). In addition, the model shows that the network size does not affect

the optimal share parameter. Consequently, the optimal royalty rate is uniform across the franchisees.

Most agency models of franchise contracting imply that the royalty rate is chosen first, as a function of incentive and risk issues; the franchise fee is then fixed to extract rents left downstream by the royalty rate[1].

Empirical background

The two-sided moral hazard explanation of royalties finds support in the econometric literature on franchise data.

Investigating the choice of franchising and monetary provisions, Lafontaine (1992) compares several agency models: risk-sharing, one-sided and two-sided moral hazard models. The implications on the level of the royalty rate are tested on US data. The multi-sector based dataset relates to 548 franchisors in 1986. Three Tobit equations are estimated for the royalty rate, the franchise fee and the proportion of franchised units. The explanatory variables are proxies for the level of risk, the upstream and downstream moral hazards and the capital needs of the franchisor. The results show that the data are most consistent with the existence of incentive issues on both sides. The level of the royalty rate is inversely related to the involvement of the franchisee and positively related to the franchisor's investment in promoting the brand name. Determinants, such as the risk, the downstream moral hazard and the capital needs, are better predictors of the propensity to franchise than the contractual design.

Agrawal and Lal (1995) test the predictions of the theoretical model presented by Lal (1990) on primary data for 43 chains and 7 sectors. The aim is to study the impact of the royalty rate and the monitoring costs on the involvement of both parties in the franchise relationship. The estimation of simultaneous equations shows that the royalty rate realises a compromise between the franchisor's incentives to invest in the promotion of the brand name and the franchisee's incentives to invest in sales services; the royalty rate positively affects the investment in the promotion of the brand name and negatively affects the franchisee's level of effort.

From US data on about 711 chains in 54 sectors for the year 1997, Brickley (2002) provides new empirical results on the determinants of the monetary provisions in franchise contracts, taking into account the bilateral moral hazard and risk issues. In the theoretical model presented in a first step, the optimal royalty rate increases with the relative importance of the franchisor's effort and the

[1] This conception of the up-front fee as a mechanism for rents extracting from the downstream firm was proposed by Rubin (1978).

franchisee's risk aversion. In this context, the royalty provision is described as an incentive device for the franchisor and an insurance device for the franchisee. The estimation results of Tobit models for the two dependent variables (the royalty rate, the up-front fee) are consistent with the predictions.

In the econometric literature, Vazquez's (2005) study is original for two reasons. The first is the use of European data. The study covers a sample of 145 Spanish networks in 2000. The second is that Vazquez takes into account the profits on the intermediate sales as an incentive device for the upstream firm. Two dependent variables are distinguished: the up-front fee and an ongoing payment variable combining the royalty rate, the advertising rate and the profits made by the franchisor on the intermediate sales to the franchisee. The explanatory variables are a series of proxies relating to the allocation of risk, the moral hazard on the franchisee's side, the moral hazard on the franchisor's side and the value of the services provided by the franchisor. Two kinds of regressions are performed, one by means of an OLS and the other using the Tobit model. The estimates support the explanations in terms of risk allocation and double moral hazard and show that the ongoing payment variable increases with the significance of the franchisor's effort.

This result is complemented by Pénard, Raynaud and Saussier (2003), whose work explains the proportion of owned units and the royalty rates in French franchise systems. Their estimates of Tobit regressions show that the brand value has a significant positive influence on both the integration rate and the royalty rate.

Finally, the econometric literature highlights the impact of incentive issues involving the upstream firm on the determination of the royalty rate in franchise systems.

Testable prediction

The aim of this paper is to enlarge the empirical evidence on several kinds of distribution networks based on the sharing of a trademark and considering different types of involvement by the upstream firm. Given the analytical framework, it is relevant to predict that the contribution of the upstream firm in the vertical relationship is a major justification for the presence of a contractual provision establishing a royalty rate.

For this reason, I propose the following hypothesis.

Hypothesis: the probability of royalties in distribution contracts is positively affected by the involvement of the upstream firm in the vertical relationship.

3. Data and Empirical Specifications

The sample is extracted from a new dataset provided by the French National Institute of Statistics and Economic Studies – INSEE. The statistical survey identifies the French distribution networks over seven units. It is exhaustive and covers all sectors of the retail trade. The networks (i.e., the head-ends) were surveyed by means of a paper questionnaire sent by post. The survey was conducted in two waves (2006 and 2008). Finally, 1397 networks are represented in the dataset. Usable data are available for 848 of them. The sample consists of the 413 networks of independent retailers using the trademark of an upstream firm. I do not take into account i) fully integrated distribution networks in which retailers are employees of the head-end and ii) groupings of independent retailers that are organised around a buying group but do not share a brand name.

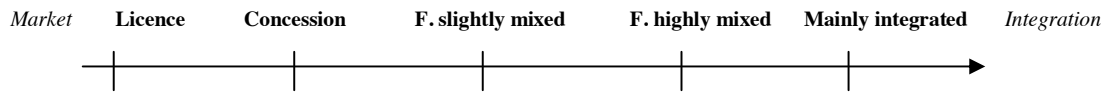
Table 1 presents the study variables. The presence of a royalty rate in the vertical contract is the *dependent variable*. Table 2 shows that the distribution of this dummy variable is quite balanced between the networks whose vertical contractual coordination includes royalties (214) and those that impose no royalties (199).

The *core explanatory variables* are related to the involvement of the upstream firm in the vertical relationship. CONCEPT is a proxy for the transmission of concepts and know-how from the upstream firm to the downstream units. More precisely, this ordered qualitative variable is constructed based on 4 dummy variables: transmission of know-how, training of teams, initial training and regular assistance. Each of these dummy variables is coded as 2 when the upstream firm provides this service to the downstream units and 0 otherwise. CONCEPT is the sum of the four dummy variables for each network, and it ranges from 0 to 8 in the sample (Table 2). PROMOTION indicates whether the upstream firm is in charge of advertising and promotional campaigns for the network. In addition, with the renting of a brand name, some head-ends become producers and develop their own brands. PBRAND represents the percentage of these original brands in the network turnover. LOGIST represents whether the upstream firm assumes logistic functions: storage, warehousing, delivery to retail outlets.

I add four *variables to control* for the influence of the age, the size, the internationalisation rate and the type of the network. The size is the number of outlets in France and abroad. The internationalisation rate is the number of outlets abroad divided by the size of the network. As shown in Table 2, the sample includes five types of networks, which are classified by the dominant type of vertical contract (the distribution is in brackets): networks mainly organised by trademark licenses (42), concessions (39), franchised networks slightly mixed with retail units owned by the upstream firm (118), highly mixed franchised networks (48) and distribution networks that are mainly

integrated (149). To present these different types of distribution networks, I use the following figure, based on the classification established by Chaudey and Fadairo (2006), which distinguishes four types of vertical relationships according to the degree of coercion for the downstream units. The classification proposed here from the INSEE database accounts for five types of networks involving independent retailers. The figure establishes a hierarchy based on increasing degrees of integration.

Figure 1 - The five alternatives for the variable TYPENET (Type of distribution network):



With a licence contract, the retailer is allowed to use a trademark under conditions imposed by the upstream firm in order to homogenise the network. A concession is a contract by which a producer enables a limited number of retailers to sell one or several products. This French distribution contract is equivalent to traditional franchising in the US case. A European franchise is analogous to the US business format franchising. The transmission of concept and know-how is central to this type of vertical contract. The INSEE identifies three kinds of franchising networks: slightly mixed (over 50% of the network turnover is achieved through franchised outlets), highly mixed (between 20% and 50% of the network turnover is achieved through franchised outlets), and mainly integrated (over 50% of the network turnover is achieved by owned units).

The sample covers a wide range of retail sectors. I use the INSEE nomenclature dividing them into "strata". Fifteen strata are distinguished in the sample. The sector-based distribution of networks is presented in Table 3. This table shows that the two main sectors are "Clothing retail" (23.24 % of sample networks) and "Home equipment" (20.10 % of sample networks).

Table 1 - The variables

Variable	Definition	Mean	Std. Dev.	Min	Max	Type
ROYALTY	Royalty rate included in the vertical contract	.5181598	.5002761	0	1	Dummy variable
CONCEPT	Proxy for the transmission of concepts and know-how	6.539952	2.045947	0	8	Ordered qualitative variable
PROMOTION	Advertising and promotional campaigns by the upstream firm	1.658596	.5721319	0	2	Ordered qualitative variable
PBRAND	Percentage of own-brands in the network turnover	36.1816	43.63439	0	100	Quantitative variable
LOGIST	Logistic functions assumed by the upstream firm (storage, warehousing, delivery to retail outlets)	1.317191	.8265144	0	2	Ordered qualitative variable
TYPENET	Type of network	2.563131	1.355179	0	4	Ordered qualitative variable
AGE	Age of the network	21.01008	20.59212	0	184	Quantitative variable
SIZE	Size of the network: number of outlets in France and abroad	167.063	467.9281	7	7770	Quantitative variable
INTERNAT	Number of outlets abroad/ SIZE	.1296777	.2289419	0	.9854	Quantitative variable

Table 2 - Distribution of networks from the qualitative explanatory variables

	Number of networks	Percent in sample
ROYALTY		
0 = no	199	48.18
1 = yes	214	51.82
Total	*413*	*100.00*
CONCEPT		
0	11	2.66
1	7	1.69
2	16	3.87
3	8	1.94
4	19	4.60
5	22	5.33
6	46	11.14
7	96	23.24
8	188	45.52
Total	*413*	*100.00*
PROMOTION		
0 = no	21	5.08
1= yes, partially	99	23.97
2= yes, totally	293	70.94
Total	*413*	*100.00*
LOGIST		
0 = no	96	23.24
1= yes, partially	90	21.79
2= yes, totally	227	54.96
Total	*413*	*100.00*
TYPENET		
0 = trademark license	42	10.61
1 = concession	39	9.85
2= franchised, slightly mixed	118	29.80
3= franchised, highly mixed	48	12.12
4= mainly owned	149	37.63
Total	*396*	*100.00*

Table 3 – Sector-based distribution of networks

	Number of networks	Percent in sample
Maintenance and repair of motor vehicles and automotive equipment trade	14	3.39
Retailing in predominantly food supermarkets	2	0.48
Retailing general supply or frozen products in small stores	5	1.21
Equipment for individuals	29	7.02
Culture-leisure-sports	28	6.78
Home equipment	83	20.10
Development of housing	35	8.47
Non-food, non-specialised retail stores	5	1.21
Craft business	15	3.63
Trade and repair of motorcycles	5	1.21
Retail sale of food in specialised stores	28	6.78
Retail sale of medical and orthopaedic devices	9	2.18
Other retail store specialising in non-food items	38	9.20
Clothing retail	96	23.24
Retail shoes	21	5.08

4. Econometric model and estimations

Methodology

The following probit equation is estimated on the full sample (413 networks) and on the sub-sample of networks where the upstream firm is a producer with own-brands (237 networks). I perform robustness tests by constructing additional models, including sector dummies, which are included in Equation (1) below.

$$Prob\,(ROYALTY_i = 1|\mathrm{X}i) = \alpha_0 + \underset{>0}{\alpha_1\ CONCEPT_i} + \underset{>0}{\alpha_2\ PROMOTION_i} + \underset{>0}{\alpha_3\ PBRAND_i} + \underset{>0}{\alpha_4\ LOGIST_i} + \beta_1 TYPENET_i + \beta_2\ AGE_i + \beta_3\ SIZE_i + \beta_4\ INTERNAT_i + \sum_{s=1}^{15} \gamma_s\ SECTOR_{s\,i} + \varepsilon_i \quad (1)$$

Full sample: $i = \{1,\ldots 413\}$

Sub-sample: $i = \{1,\ldots 237\}$

$s = \{1, \ldots, 15\}$

α = parameters related to the core explanatory variables
β = parameters related to the control variables
γ = parameters related to the sector dummies (robustness tests)
ε = error term
i = network
s = sector
The expected signs for the core explanatory variables are below the parameters

The correlation matrix relating to the quantitative variables reveals no problematic correlation; the higher correlation (0.43) occurs between the variables SIZE and INTERNAT (Appendix 1). However, the Pearson chi-square tests, which are applied to see if there is a relationship between the categorical variables, highlight a potential problem of multi-collinearity (Appendix 2). For this reason, I use a step-by-step econometric approach, introducing the regressors gradually.

I control for heteroskedasticity. When necessary, the standard errors are corrected.

Results

The estimation results are reported in Tables 4 and 5.

Table 4 – Probit estimates for ROYALTY - Full sample (413 networks)

	(1)	(2)	(3)	(4)
CONCEPT	0.213***	0.208***	0.215***	0.209***
	(0.0398)	(0.0408)	(0.0440)	(0.0451)
PROMOTION	0.463***	0.480***	0.498***	0.469**
	(0.130)	(0.133)	(0.139)	(0.144)
PBRAND	-0.00330*	-0.00351*	-0.00343*	-0.00210
	(0.00155)	(0.00161)	(0.00170)	(0.00184)
LOGIST	-0.244**	-0.303**	-0.301**	-0.228*
	(0.0885)	(0.0967)	(0.0974)	(0.105)
TYPENET		0.0852	0.0575	0.145*
		(0.0565)	(0.0593)	(0.0699)
AGE			0.00461	0.00312
			(0.00304)	(0.00356)
SIZE			-0.0000560	-0.0000891
			(0.000138)	(0.000158)
INTERNAT			0.161	0.0854
			(0.355)	(0.359)
Sector dummies	-	-	-	*yes*
_cons	-1.698***	-1.801***	-1.945***	-7.581***
	(0.332)	(0.338)	(0.379)	(0.490)
Prob > chi2	0.0000	0.0000	0.0000	0.0000
Pseudo R^2	0.1133	0.1239	0.1275	0.1950
% Predicted	65.86	65.66	67.11	70.74

Robust standard errors (in brackets)
$^{*}\ p < 0.05,\ ^{**}\ p < 0.01,\ ^{***}\ p < 0.001$

Table 5 – Probit estimates for ROYALTY - Sub-sample (237 networks)

	(1)	(2)	(3)	(4)
CONCEPT	0.260***	0.266***	0.261***	0.314***
	(0.0637)	(0.0651)	(0.0682)	(0.0797)
PROMOTION	0.577**	0.598**	0.595**	0.615**
	(0.188)	(0.195)	(0.204)	(0.236)
PBRAND	-0.00708**	-0.00673**	-0.00693**	-0.00830*
	(0.00231)	(0.00239)	(0.00258)	(0.00331)
LOGIST	-0.113	-0.158	-0.181	0.0916
	(0.134)	(0.146)	(0.148)	(0.184)
TYPENET		0.0213	0.0237	0.0437
		(0.0795)	(0.0836)	(0.113)
AGE			0.00287	0.00177
			(0.00346)	(0.00409)
SIZE			-0.0000692	-0.000144
			(0.000161)	(0.000193)
INTERNAT			0.465	0.420
			(0.434)	(0.452)
Sector dummies	-	-	-	*yes*
_cons	-2.122***	-2.184***	-2.253***	-8.926***
	(0.497)	(0.504)	(0.543)	(0.788)
Prob > chi2	0.0000	0.0000	0.0000	0.0000
Pseudo R^2	0.1291	0.1356	0.1342	0.2364
% Predicted	64.98	65.93	67.58	73.71%

Robust standard errors (in brackets)
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

These estimates enable us first to comment on the quality of the econometric models. The pseudo R-squared are not very high (between 0.11 and 0.23), which is typical of cross-sectional data. The good global significance of the models is highlighted by the chi-square probabilities (which are systematically to equal 0), the percentage predicted (between 65 and 73.7), and the area under the ROC[2] curve: 0.7361 (model 3), 0.7829 (model 4) in the full sample, 0.7272 (model 3), 0.8043 (model 4) in the sub-sample (see Appendix 3).

[2] Receiver Operating Characteristic.

The comparison of the estimated models shows that the results are robust.

With one exception[3], the estimates on the full sample provide evidence that all the core explanatory variables have a significant influence on the probability that the vertical contract includes royalties. These results are qualitatively similar (significance of the parameters, signs of the coefficients) on the sub-sample, except for the variable LOGIST, whose impact is not significant. As predicted, the transmission of concepts and know-how by the upstream firm as well as its involvement in advertising and promotional campaigns for the brand increase the probability of royalties. Thus, a high level of involvement of the upstream firm in the transmission of concepts and know-how adds 8% to the probability that the vertical contract includes royalties. Moreover, in networks where the upstream firm is in charge of advertising and promotional campaigns, the probability of royalties is higher at 18% (see Appendix 4).

In accordance with the prediction, the percentage of the own-brands in the network turnover impacts the probability for royalties, but the sign is the opposite of the predicted one. However the marginal effects of this variable are very low, which minimises the result (Appendix 4). The assumption of logistic functions by the upstream firm significantly influences the probability of royalties in the full sample. This is not the case in the sub-sample. Here again, when the influence of this variable is significant, the negative sign is the opposite of the predicted one; when the upstream firm assumes logistic functions, the probability of royalties decreases by 11% in the full sample (Appendix 4).

Surprisingly, the control variables have no influence here. The age, the size and the internationalisation rate of the network do not affect the probability of royalties. In addition, the explanation for this monetary contractual device appears to be independent of the type of network.

[3] PBRAND in the model with sector dummies.

5. Conclusion

In the agency literature, the presence of royalties in distribution contracts is justified by the need to insure the downstream party against risk or by the context of a two-sided moral hazard. This paper investigates this second explanation using recent data on several types of distribution networks in France.

I fit a probit model of the decision to include royalties in the vertical relationship, depending on the contribution of the upstream firm. The estimation results clearly state that regardless of the type of network, royalties are justified by the involvement of the head-end in the transmission of concepts and know-how and in the promotion of the network.

The results are more ambiguous concerning the role of the upstream firm in logistic functions and the percentage of owned-brands in the network turnover. Their negative influence on the probability of having royalties in the vertical contract is unexpected. Concerning the own-brands, the explanation may be that the profits on the intermediate sales act as a substitute for royalties for the upstream firm. The idea of intermediate sales as an incentive device for the upstream firm, analogous to royalties, has been introduced by Vazquez (2005). However, the roles of these two variables (percentage of own-brands in the network turnover; logistic functions assumed by the upstream firm) in the explanation of the presence of royalties must be minimised; the marginal effects are very low (percentage of own-brands), and the results are not robust on the sub-sample (logistic functions).

The evidence suggests that the contribution of the upstream firm affects the presence of royalties in the vertical contract when it is related to the maintenance of the brand-name capital. This is the case with the transmission of concepts and know-how as well as advertising and promotional campaigns, but not with the profits on the intermediate sales and logistic functions. The significance of brand-name capital as a key explanation for royalties appears to be the main result of the paper, which is consistent with the previous literature. This paper shows that the explanation can be generalised to different types of distribution networks sharing a trademark.

Finally, attention should be directed towards the range of activities involved in retail networking. In this paper, sector dummies are used to perform robustness tests. The estimations show that a sector-based explanation for royalties may be relevant, far more than an explanation related to the age, the size or the international nature of the network. Further investigations of this key monetary contractual device could examine this property in greater detail.

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APPENDIX

1 – Correlation matrix (quantitative variables)

	PBRAND	AGE	SIZE	INTERNAT
PBRAND	1.0000			
AGE	0.0426	1.0000		
SIZE	0.0080	0.0529	1.0000	
INTERNAT	0.2341	0.1988	0.4281	1.0000

2 – Chi 2 tests of independence (qualitative variables)

	PROMOTION			
CONCEPT	0	1	2	Total
0	6	4	1	11
1	1	3	3	7
2	0	6	10	16
3	1	2	5	8
4	1	5	13	19
5	4	6	12	22
6	3	12	31	46
7	2	33	61	96
8	3	28	157	188
Total	21	99	293	413

Pearson chi2(16) = 96.3875 Pr = 0.000

	LOGIST			
CONCEPT	0	1	2	Total
0	6	2	3	11
1	3	2	2	7
2	1	3	12	16
3	2	3	3	8
4	5	2	12	19
5	9	8	5	22
6	20	5	21	46
7	33	34	29	96
8	17	31	140	188
Total	96	90	227	413

Pearson chi2(16) = 90.7817 Pr = 0.000

	TYPENET					
CONCEPT	0	1	2	3	4	Total
0	5	1	3	1	1	11
1	2	1	1	1	2	7
2	2	1	5	1	6	15
3	3	1	1	0	3	8
4	4	4	4	0	7	19
5	7	4	4	1	5	21
6	4	3	12	7	18	44
7	9	11	41	12	21	94
8	6	13	47	25	86	177
Total	42	39	118	48	149	396

Pearson chi2(32) = 78.3662 Pr = 0.000

	LOGIST			
PROMOTION	0	1	2	Total
0	13	3	5	21
1	33	34	32	99
2	50	53	190	293
Total	96	90	227	413

Pearson chi2(4) = 50.3430 Pr = 0.000

	TYPENET					
PROMOTION	0	1	2	3	4	Total
0	5	4	4	2	6	21
1	21	13	31	12	20	97
2	16	22	83	34	123	278
Total	42	39	118	48	149	396

Pearson chi2(8) = 37.1203 Pr = 0.000

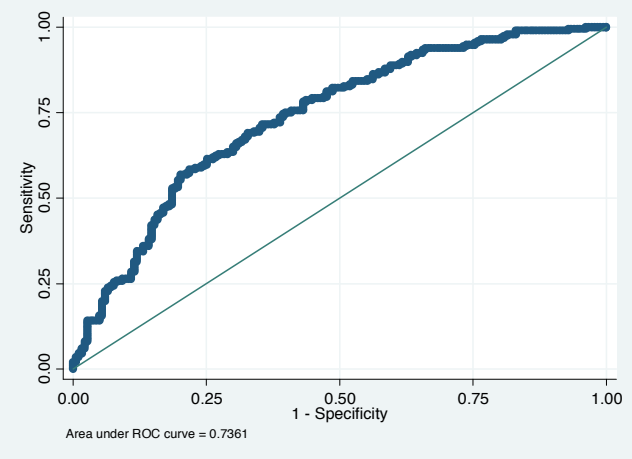
	TYPENET					
LOGIST	0	1	2	3	4	Total
0	17	16	36	9	15	93
1	19	10	37	10	10	86
2	6	13	45	29	124	217
Total	42	39	118	48	149	396

Pearson chi2(8) = 100.2026 Pr = 0.000

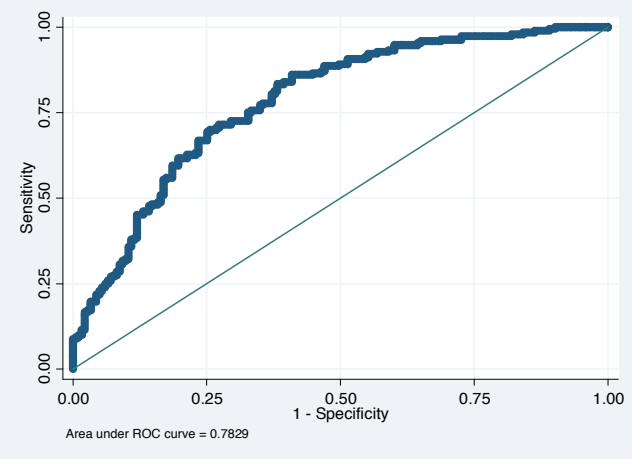
3 – ROC Curves

Full sample

Model 3

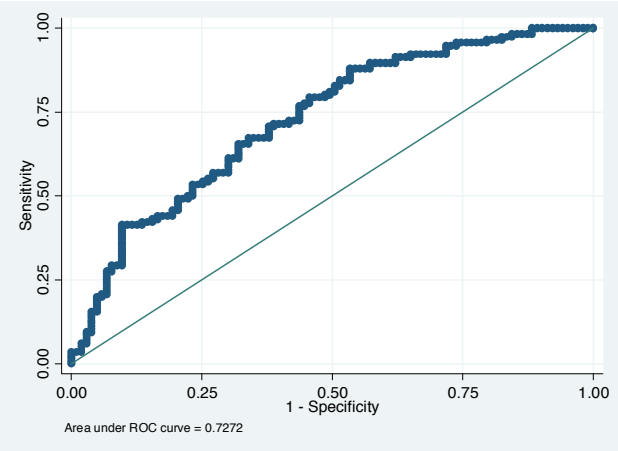


Model 4

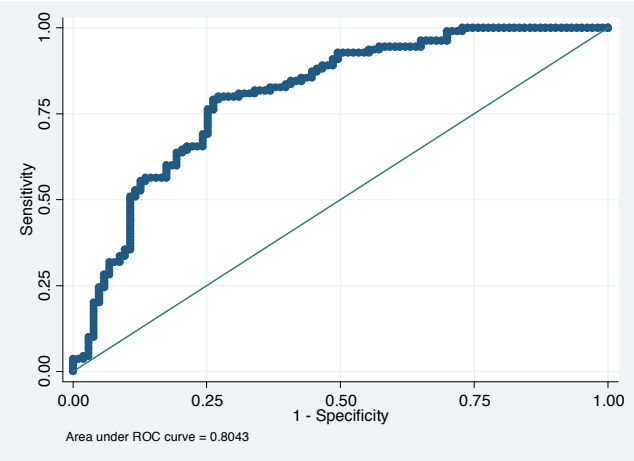


Sub-sample

Model 3



Model 4



4 – Marginal effects after probit

Full sample

Model 3

variable	dy/dx	Std. Err.	z	P>|z|	[95% C.I.]		X
CONCEPT	.0832095	.01629	5.11	0.000	.051284	.115135	8
PROMOTION	.1926955	.05268	3.66	0.000	.089454	.295937	2
PBRAND	-.0013296	.00066	-2.00	0.045	-.002631	-.000028	60
LOGIST	-.1164834	.03884	-3.00	0.003	-.192609	-.040358	2
TYPENET	.0222772	.02305	0.97	0.334	-.022901	.067456	3

Model 4

variable	dy/dx	Std. Err.	z	P>|z|	[95% C.I.]		X
CONCEPT	.0796627	.01646	4.84	0.000	.04741	.111916	8
PROMOTION	.1790529	.05375	3.33	0.001	.073696	.28441	2
PBRAND	-.0008013	.00071	-1.13	0.258	-.002191	.000588	60
LOGIST	-.0871937	.04125	-2.11	0.035	-.168052	-.006336	2
TYPENET	.0554587	.02675	2.07	0.038	.003027	.107891	3

Sub-sample

Model 3

variable	dy/dx	Std. Err.	z	P>|z|	[95% C.I.]		X
CONCEPT	.0941042	.02305	4.08	0.000	.048929	.139279	8
PROMOTION	.2147631	.07114	3.02	0.003	.075331	.354195	2
PBRAND	-.002501	.00091	-2.75	0.006	-.004285	-.000716	60
LOGIST	-.0653016	.05481	-1.19	0.233	-.172726	.042123	2
TYPENET	.0085414	.03025	0.28	0.778	-.050742	.067825	3

Model 4

variable	dy/dx	Std. Err.	z	P>|z|	[95% C.I.]		X
CONCEPT	.1093163	.02548	4.29	0.000	.05938	.159252	8
PROMOTION	.21398	.07749	2.76	0.006	.062098	.365862	2
PBRAND	-.0028875	.00112	-2.58	0.010	-.005081	-.000694	60
LOGIST	.0318574	.06292	0.51	0.613	-.091469	.155184	2
TYPENET	.0152037	.03923	0.39	0.698	-.061685	.092093	3